The spider's web

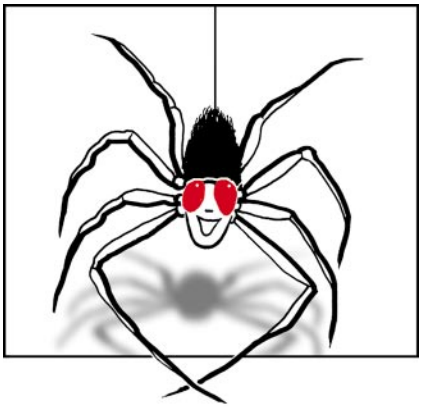
Pass the protocol

Producing collections of methods for molecular biologists is a lucrative business, and publishers of successful protocol handbooks are understandably wary about making them available through the web. But the internet is beginning to offer an important route for researchers to share protocols with each other.

Lab pages

Major labs, especially those working on a single experimental organism, increasingly share their experience through the web. Nematode researchers, for example, will find useful worm-specific material at http://www.dartmouth.edu/artsci/bio/ambros/protocols.html. It seems *Drosophila* labs are more shy when it comes to sharing protocols, but the contribution from Rich Carthew's lab (http://info.pitt.edu/~carthew/manual/Manual.html) may start a trend.

Graduate students starting out in biochemically oriented *Xenopus* labs should definitely take a look at the protocols from Tim Mitchison's lab (http://util.ucsf.edu/mitchi/Protocols/protocols.html). Refreshingly informal, these methods include the crucial minutiae usually only picked up through bitter experience, such as "Add a tiny pinch of $NaBH_4$. Make sure the sample is in a large tube since it tends to fizz up."



Even for techniques which rely heavily on hands-on experience, such as microinjection of single cells, the Mitchison lab's pages suggest tips and tricks which could help even an old hand. Until recently, this sort of information circulated only to a lucky subset of researchers, through course hand-outs and chains of faded photocopies; here, at least, the web seems to be democratizing science.

Manufacturers

Manufacturers' web sites have been covered recently (see *Curr Biol* 1996, **6:**1046), and many include protocol information. Promega's collection (http://www.promega. com/) is perhaps the most comprehensive, but others are working to catch up. There is a good list at http://www.ifrn.bbsrc.ac.uk/gm/lab/ docs/protocols.html.

Cell biology

William H. Heidcamp's excellent NSF-funded *Cell Biology Laboratory Manual* (http://www.gac.edu/ cgi-bin/user/~cellab/phpl?contents.html) is a well-organized compilation of information from Biology course hand-outs at Gustavus Adolphus College, Minnesota. It includes plenty of information about traditional cell biology (unlike most internet resources, which concentrate on cloning techniques). Extensive notes and appendices go into the theoretical background to techniques such as centrifugation and microscopy, so this is much more than a recipe book.

Molecular biology

Northwest Fisheries Science Center (http://research.nwfsc.noaa.gov/protocols.html) has a good collection of protocols tilted towards cloning, the polymerase chain reaction (PCR) and nucleic acid hybridization. The site is searchable and also has an on-line discussion forum.

Plenty of basic molecular biology methods are also available at http://iubio.bio.indiana.edu:80/Molecular-Biology/, and these protocols are also fully searchable. But they haven't been updated since 1992 and it shows.

PCR

PCR is inherently simple, but ever-increasing refinements mean that researchers always want updates. There are a host of web resources covering PCR, and the best place to start is the PCR Jumpstation (http://www.apollo.co.uk/a/pcr). Some links to manufacturers' and publishers' pages will tantalize you with the implication that all would be solved if only you buy their new thermal cycler or protocol book, but there is also fair amount of method information and a good collection of links. Also worthy of attention are the pages at the Weizmann Institute (http:// bioinformatics.weizmann.ac.il/mb/bioguide/pcr/contents.html), where Jaime Prilusky has edited PCR information from the bionet.molbio.methds-reagnts newsgroup list of frequently asked questions (FAQ) into a useful, coherent resource.

Online discussion

The BIONET methods and reagents newsgroup (news://bionet.molbio.methds-reagnts) is as vulnerable as the rest of USENET to playground-style bickering ('My miniprep is better than yours, so there'), and can become obsessed with truly pointless subjects ('What is the right way to pronounce pUC?'). If you feel a burning need to join such discussions, make sure you read Paul N. Hengen's FAQ list first (ftp://ftp. ncifcrf.gov/pub/methods/FAQlist). It summarizes all the issues which have been discussed to death, including extensive coverage of PCR, a recipe for perfect double-stranded miniprep DNA for sequencing, and useful protocols for DNA recovery from agarose gels using glass-milk.

Still want more?

Cell and Molecular Biology (http://www.tiac.net/users/pmgannon/) is a valuable collection of selected biological links, each with a succinct description; it's organized by subject and has an especially good section on materials and methods.

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